

## **Wearable textile pressure sensors based on PEDOT:PSS**

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Recent study in the field of safety at workplace are focus on develop new sensors and procedures to detect and monitor the body stress due to repeated or highly stressful movements that, in the long term, could lead to painful traumas or accidents. Today, the common method used to evaluate risk activities is based on subjective evaluation or supported by difficult and time-consuming video analysis. However, the recent developments in wearable sensors, in particular on pressure sensors, allow designing innovative alternatives. The main requirements of wearable pressure sensors are a good wearability to don't hinder the natural movements, but also a sensor response in a broad range of pressure, in order to cover all the possible activities stress.

A new generation of textile pressure sensors based on a conductive polymer that can be easily fabricated directly on fabric, it is presented. This innovative sensors can be used, for example, to fabricate sensorized gloves to monitor the hand's stress during manual activity. The main advantages of the proposed technology regard the possibility to selectively tune the pressure response range, adapting it to possible different applications, by changing the formulation of the conductive polymer while leaving the same device architecture and structures. We fabricate and characterize the pressure sensors, analyze the response and propose an interpretation of the obtained results, based on piezoresistive phenomena. We identify three different contributions to the sensor output, related to the macroscale, microscale and nanoscale, respectively. The here proposed tunable textile pressure sensors pave the way for a new generation of smart textiles in a field, such as the safety in work place, that is in continuous increase of interest.